

# BATTERY DEFENSE: NOT JUST THE LAST RESORT

A Monograph  
By  
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Field Artillery



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## ABSTRACT

BATTERY DEFENSE: NOT JUST THE LAST RESORT by MAJ William N. Vockery, USA, 54 pages.

This monograph analyzes the methodology of perimeter defense for artillery units in OOTW situations. The battery perimeter is not the same as a standard maneuver defensive position. The battery has more than one mission and considerably fewer soldiers to man perimeter fighting positions. The generally circular nature of the perimeter changes where and how fields of fire interlock, especially from the doctrinal fighting position. The battery commander must account for these differences in his planning before occupying the position.

The monograph first examines the current procedures used to select and occupy an artillery position. The defense, as outlined in Field Manual 6-50, is then examined as it relates to an OOTW situation. Historical lessons learned from Vietnam and modern OOTW deployments are then examined. The lessons of these historical situations are then analyzed for appropriate methods of defending a static position against various threats. Key to the defense is an understanding of the relationships between the systems, sectors of fire, and force protection measures. A greater number of perimeter positions are required to overcome the restricted fields of fire inherent in the doctrinal two-man position. The battery, with its limited personnel, has difficulty manning enough positions to effectively secure itself using the standard position. The battery can do better at defense if it realizes its limitations and plans the defense before occupation. This allows the commander to position all his systems to both support the defense and indirect fire missions. After analyzing the position, changes in Doctrine, Organization, Materiel, and Training are then recommended.

In conclusion, the battery should be able to defeat most OOTW threats if the defense is adequately prepared. This will not occur if the battery occupies and then develops a plan for the defense. The current doctrinal occupation process does not adequately address the situation units face in OOTW environments and therefore should be changed.

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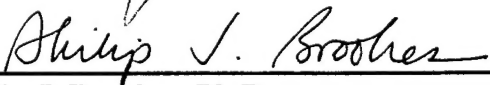
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A fire support base is a rapidly constructed artillery position defended by a minimum number of infantry troops. It is established to support a maneuver force operating away from fixed lines of communication for a limited period of time.<sup>1</sup>

## FMFM 8-2, Counterinsurgency Operations

### I. Introduction

TRADOC Pamphlet 525-5, Force XXI Operations, predicts that the majority of future conflicts will occur toward the Operations Other Than War (OOTW) end of the conflict spectrum. The most likely enemy threats are guerrillas, partisans, terrorists and WWI type infantry.<sup>2</sup> The tactics used by these kinds of forces are obviously different than the conventional, high-tech foes expected during the Cold War. Small groups of idealistic soldiers may use a variety of unconventional techniques in an attempt to subvert support for U.S. operations. Success on this battlefield will probably be measured by appearance as much as battle. If U.S. forces are successful in protecting themselves and their allies, they will strengthen popular support both in the contested nation and at home.<sup>3</sup> If, on the other hand, US forces are not successful, the reaction of the American people could change very rapidly. As 525-5 explains, actions at the lowest level can have strategic importance. Field Manual 6-50, The Field Artillery Cannon Battery states that a battery with poor defenses can be effectively neutralized by 10 dismounted infantrymen.<sup>4</sup> Field Artillery batteries at the combat training centers (CTCs) are often attacked by less than 10 men yet suffer disproportionately high losses.<sup>5</sup> It is doubtful that the American public will accept this in an OOTW situation.

As a fixed and identifiable symbol of U.S. involvement in regional conflict, the fire base presents a lucrative target for enemy attack. The base is an easy target for mortars or

rockets because it is stationary. It is also subject to attack by mounted, dismounted, terrorist, and other unconventional forces.<sup>6</sup> Even slight damage to the base or surrounding population center can be exploited by the enemy to show weakness.<sup>7</sup> These large effects from such small contacts cause serious problems for the force commander.

Deputy Assistant Secretary of Defense for Peacekeeping/Peace Enforcement Policy, Sara Sewall, stated in an article on peace support, that “the threat of military force may be necessary to create the context for the [political and humanitarian] efforts.”<sup>8</sup> The role of field artillery batteries in these situations has not dramatically changed.<sup>9</sup> Artillery still provides the timely and accurate fires required by maneuver forces as they conduct combat operations. As they are currently organized and trained, however, artillery batteries are particularly vulnerable to the types of unconventional, dismounted attacks expected in OOTW.<sup>10</sup> Field Manual 6-50 does not explain the fundamental requirements for the battery leadership to plan a successful defense. As a result, batteries suffer needless casualties at the CTC and could present vulnerable targets in an OOTW situation.

The Army executed perimeter defense in Vietnam against an enemy whose tactics ranged from set-piece battles to sapper and indirect fire attacks. The utility of the Army’s extensive preparations was that if the perimeter was secure against large unit attacks, it was also ready for the smaller attacks more characteristic of the later years.<sup>11</sup> The defensive planning and preparation techniques used by leaders in Vietnam are still applicable today as units occupy static positions in OOTW situations.

Maneuver commanders meticulously plan engagement areas to defeat an enemy. This process involves counting and comparing friendly systems and capabilities with the



number of enemy systems expected in the engagement area over time. Sectors of fire are laid out with near geometric precision to insure the maximum number of systems are brought to bear. Control measures are adjusted as friendly elements maneuver to reduce the chance of fratricide. The battery perimeter is also an engagement area focussed on attackers. Certain sectors are more vulnerable than others, but no portion should go completely undefended. To maximize the direct fire coverage of this area, the artillery planner must conduct as detailed an analysis as that of his maneuver counterpart.<sup>12</sup> An understanding of systems capabilities, doctrine, and threat is especially important in the planning process.

The Army has trained artillerymen to survive through mobility and dispersion.<sup>13</sup> Current defensive preparations are temporary at best given the rapid tempo and short time units expect to spend in a particular location.<sup>14</sup> Field Artillery batteries are not manned at levels that can compensate for an inefficient perimeter defense. Although the soldiers in the battery can operate their assigned weapons, the ability to integrate their effects into an effective defense does not occur without rigorous planning before occupation. The battery must protect itself and conduct indirect fire. If the threat demands a significant defensive commitment or large amounts of indirect fire, then the battery may not be able to do both. In a force projection army, everything brought into theater must be used to its maximum potential. However, maneuver forces diverted from their primary missions to defend the perimeter should be the exception rather than the norm.

## **II. Background**

Before examining the implications of an OOTW battlefield, the conflict for which the artillery is currently trained and organized needs to be examined. While NATO and the Warsaw Pact faced each other across the inter-German border, the Field Artillery and Army in general focused on the mid- to high-intensity battlefield.<sup>15</sup> The enemy could identify our batteries quickly using radars, radio direction finders and HUMINT assets<sup>16</sup>. Within minutes, the enemy was expected to attack with “upward of 600 rounds fired into a 200- by 100-meter area.”<sup>17</sup> They could also attack with high performance aircraft, helicopters, mounted, dismounted, airborne and air assault forces.<sup>18</sup> The doctrinal response to this threat was to “shoot and scoot.” These tactics figured prominently in the development of the Paladin howitzer and Multiple Launch Rocket System (MLRS). MLRS moves between firing points after each mission thus preventing accurate counter fire.<sup>19</sup> The Paladin was designed to fire after only a small pause in movement from widely dispersed formations.

The conventional battlefield was essentially linear with a well-defined framework of close, deep and rear.<sup>20</sup> Most rear area direct fire threats were minor engagements handled by the unit attacked.<sup>21</sup> The proximity of maneuver forces provided the artillery some security. The movements of these large mechanized formations cleared significant ground threats from the artillery position areas. Indirect fire and air attacks were the primary threats and the doctrinal survival techniques were movement and dispersion. If all the batteries were moving, they were not as responsive. If the batteries dispersed over too

large an area, then they were difficult to control. Decreasing occupation and displacement times while maintaining dispersion is therefore the focus of training and organization to improve artillery survivability.<sup>22</sup>

The firing battery was redesigned with the 3x8 organization, to counter the conventional threat. The larger, six-gun battery was broken into two, four-gun platoons. This increased the firepower of the battalion by six tubes, yet decreased the signature of each firing element by two tubes. By organizing into platoons, the battalion had six elements maneuvering instead of three. More howitzers were, therefore, ready to fire at any given time. In mechanized units, mobility was enhanced by keeping ammunition uploaded on vehicles. Light artillery units were also equipped with additional vehicles to carry their ammunition. This led to a doubling of howitzer section vehicles when the batteries changed from Gamma Goats to HMMWVs.

The leadership of the basic firing unit in the 3x8 battalions went from the battery commander and first sergeant to the platoon leader and platoon sergeant. The battery commander's focus became position selection, resupply coordination, and movement planning rather than the gun line.<sup>23</sup> Although light units have not changed their organization, the US Army Field Artillery School's focus continues to be the platoon and the split-battery organization of the heavy division in conventional conflict as evidenced by FM 6-50. Light units are most likely to deploy into an OOTW situation according to FM 7-98, Operations in Low Intensity Conflict, but a heavy battery deployed to Somalia. This reinforces the importance of all methods of defense to all types of artillery.

The focus of training for the battery commander is the reconnaissance, selection,

and occupation of a position (RSOP).<sup>24</sup> Properly executed, RSOP allows the battery to rapidly occupy a position and establish a firing capability.<sup>25</sup> The Battery Computer System (BCS) optimizes the effects on target regardless of the howitzers formation. The combination of the BCS and RSOP allowed the battery to occupy rapidly, maximizing cover, concealment and dispersion. The rapid tempo of combat operations forces the battery commander to continually look for new positions.<sup>26</sup> The focus on movement and RSOP affects the defense in two ways. First, a significant portion of the battery is always away from the position with the Advanced Party thus reducing the defensive power of each section. Second, the short time in position reduces the howitzer sections' ability to prepare an effective defense.

The RSOP process centers on selecting a position from which to deliver indirect fires. Defensibility of the position is a secondary consideration.<sup>27</sup> During the reconnaissance phase, the battery commander selects likely locations using a map or guidance from the battalion. He then issues a warning order, gathers the advanced party and leaves on his reconnaissance. The warning order covers the routes, azimuth of fire, start point, release point, enemy and friendly situation but does not include the plan for defense.<sup>28</sup> After deciding whether the position supports indirect fires, the battery commander roughly places the first platoon (not individual howitzers) on the ground then departs to position his second platoon.<sup>29</sup> In a six-gun battery, the commander could focus on the howitzers and defensive positions, but FM 6-50 makes no distinction during RSOP between the platoon and battery-based organizations. The gunnery sergeant and first sergeant are responsible for establishing the defense before the occupation. The primary

mission, however, is to position gun guides and other battery assets before the main body arrives.<sup>30</sup> The defense is planned and executed, after the battery occupies the position. The positioning of the howitzer section machine-gun, for example, is left to the platoon sergeant who arrives with the main body.<sup>31</sup>

The most serious problem with the RSOP process is the lack of defensive planning before the occupation of the position. There is no doctrinal requirement to plan for the defense before occupation. This is the result of an overemphasis on mobility and dispersion in the manual and the manual's focus on a single threat model. There is no change in the RSOP process although different threats are identified in the chapter on defense.

The Marines captured the Vietnam firebase lessons in FMFM 8-2, Counterinsurgency Operations.<sup>32</sup> They tie the security of the firebase to the supported maneuver commander and task him with the planning and coordination required to execute the defense of this static position. Interesting is the focus on the leadership and planning required for a firebase which the Marines assign to the supported maneuver commander who has the requisite assets and staff.<sup>33</sup> The actual occupation and establishment of a perimeter still involves the battery, and therefore its leadership must understand the requirements for defense.

When an Army infantry platoon conducts the defense, the platoon leader and platoon sergeant position the crew served weapons based on specific guidance from the company commander and first sergeant. The squad leader fills the gaps between crew-served weapons with his individual riflemen.<sup>34</sup> Doctrinally, the company commander is

responsible for positioning his crew served weapons. Field Manual 6-50 allows the section chiefs to position their machine guns after occupation. The platoon sergeant is responsible for integrating them into the defense after he arrives. No one is specifically tasked to integrate individual weapons into the defense. The battery commander is almost guaranteed to have ineffective coverage on the perimeter because of this.

The defense of the battery is not a mission in and of itself.<sup>35</sup> When a maneuver unit is assigned a mission, they orient all their actions toward it. Artillery units must not only defend but provide fires as well. Field Manual 6-50 states that the battery has the option of leaving if attacked.<sup>36</sup> This was not the case in the 1973 and earlier versions of FM 6-50 when the battery had to provide indirect fire, even while under attack. Maneuver forces will sometimes support the defense of a battery perimeter, but this should not become a requirement simply because the battery leadership could not effectively organize their own defense.

### **III. Historical Perspective**

#### **Vietnam**

Artillery in Vietnam provided indirect fire for maneuver forces in contact. Battalion and brigade formations of artillery did not perform this mission as was expected in conventional conflict. Instead, units were widely dispersed in battery and sometimes smaller positions. Often weapons of different calibers were collocated to provide greater flexibility to the supported commander. Indirect fires were provided to the requesting unit from a web of mutually supporting positions. Positioning artillery to cover their sectors was critical to the success of maneuver operations.<sup>37</sup> Maneuver commanders did not plan

their operations without first planning the employment and positioning of the artillery.<sup>38</sup>

The responsive, all-weather fires which are the primary mission of field artillery units became a substitute for the direct fire close fight wherever possible.<sup>39</sup> Right or wrong, this required enormous expenditures of ammunition and manpower. The artillery position and its logistic tail, as relatively immobile sources of combat power, became a high payoff target.<sup>40</sup> The enemy avoided maneuver forces to selectively attack the supporting bases.<sup>41</sup> This forced the supported maneuver commander to provide base defense.<sup>42</sup> One division commander estimated that over one quarter of his forces were providing security to fixed installations.<sup>43</sup>

Neither artillery doctrine nor training captured the change which occurred in battery defense.<sup>44</sup> Before Vietnam, artillery doctrine was focused on the defense of a position on the conventional battlefield. It identified dismounted forces as a threat, the most likely threat in LIC, but not how a battery was supposed to defend itself from this threat. Similar to current doctrine, the battery positioned machine guns to cover the perimeter and then formed a ground force which conducted patrols and was the reaction force. Listening and Observation Posts (LP/OPs) were recommended to provide early warning.<sup>45</sup> The manual did not state how far the LP/OP should be from the battery or where the soldiers for patrolling were to come from.<sup>46</sup>

These considerations, acceptable in conventional conflict, were totally inadequate in Vietnam.<sup>47</sup> The defensive tactics adopted by units after arrival are evidence of this.<sup>48</sup> Batteries did not patrol, nor in some cases provide their own defense. Instead, they were often occupants of a perimeter established by the infantry. Batteries quickly discovered

they did not have the manpower to both defend themselves and conduct indirect fire.

The battery had weapons for defense and the Table of Organization and Equipment (TOE) said it was capable of defending itself against some threats. With eight machine guns, the battery had double the number in an infantry company,<sup>49</sup> and of course six howitzers and individual weapons. The howitzers were manned by nine men and the battery service and support personnel (mechanics and cooks) were still assigned.<sup>50</sup> Why then was the battery unable to defend itself as artillery doctrine said it should?

Obviously the threat had something to do with the defense. That the VC and NVA attacked with great intensity and personal courage cannot be denied. Current doctrine states that a battery should be able to defeat threats up to small-unit, dismounted attack and delay attack of higher intensity until the Tactical Combat Force can respond.<sup>51</sup> A unit attacked in Vietnam would not have to delay long given the mobility provided by the helicopter and the firepower available.

Why were batteries not left to defend themselves if they were organized and equipped to meet the threat and had a doctrine that supposedly specified how? Occasionally batteries were positioned without maneuver forces for protection. The 1st Cavalry Division used helicopter raids to rapidly emplace artillery and cover their areas of operations. These batteries had little protection since the enemy chose not to attack during the short time they were in position.<sup>52</sup> Typically a raid was executed by a battery with the purpose of striking at deep intelligence generated targets in areas the enemy perceived as secure. They were also executed to deceive the enemy as to the actual location of major offensives. The raid usually lasted 6-8 hours, involved at least an



infantry platoon for security and entailed firing 1500 rounds.<sup>53</sup> The raids were staged, however, from bases that were protected by maneuver forces. The raid changed into the rapid construction of a fire base when the North Vietnamese began attacking forces immediately after they landed on an LZ.

An Australian task force deployed without considering the defense of their artillery during an operation northeast of Saigon in May of 1968. The position of the task force at the end of the first night is shown in **Figure 1**.<sup>54</sup>

There was no coordinated plan for the defense even though the 102d Battery was within a few hundred meters of the Task Force Headquarters and other maneuver forces. The 161 FD Battery

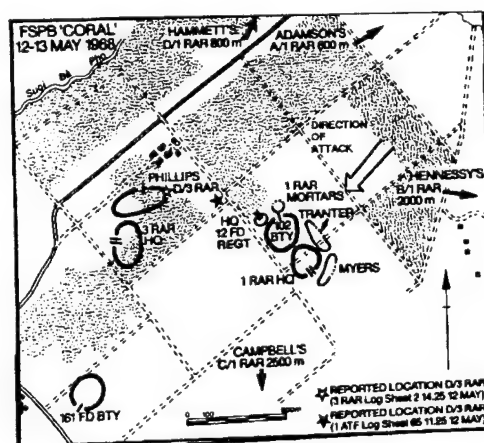


Figure 1

had no units around it at all. The task force did not plan the sectors of fire for the battery or maneuver units nor had effective defensive positions been prepared. Only the severe punishment inflicted by attack aviation and supporting artillery kept the enemy from completely overrunning the position. The 102d battery lost one howitzer and eight men killed but more importantly, was unable to continue its mission of providing indirect fire. Maneuver elements near the battery could not assist because of the effective enemy fire and poor coordination between units on the LZ.<sup>55</sup>

The battery was attacked again the next evening and again, the attack failed because of supporting fires rather than direct fire. Although the overall defensibility had

improved slightly, it was still uncoordinated and incomplete.<sup>56</sup> The task force pulled an entire battalion around the perimeter for security after the second attack.<sup>57</sup> Due to the size of the position, however, four companies were unable to provide complete coverage. More importantly, this maneuver battalion was unavailable for offensive missions in sector.

It is not surprising the defense was a secondary consideration since batteries occupied fire bases to provide indirect fire. The number of rounds fired by one howitzer during a single operation might be in the thousands. Even with a nine man crew, just moving the ammunition to the howitzer takes a huge toll on the endurance of the crewman.<sup>58</sup> An artillery battery needed all its' manpower to accomplish the primary mission. This forced maneuver units to defend batteries that were supporting their operations from fixed fire bases.<sup>59</sup>

The enemy in Vietnam had three primary methods of attacking US positions; large unit, small unit/sapper, and stand-off.<sup>60</sup> Defense against a large unit required the effective combination of both direct and indirect fire. A significant factor in the defense was delaying the enemy at a distance from the perimeter fighting positions. According to many SOPs, units occupying fire bases were to erect wire before the end of the first night.<sup>61</sup> In comparison, infantry companies occupying night defensive positions (NDP) often had no such obstacle belt but were still able to defeat large unit attacks.

In defense of the NDP, a company would use LP/OPs, aggressive patrolling, and some form of reserve to reinforce the perimeter. Indirect fires were not only planned, but adjusted in around the position as were visual aids for supporting aircraft.<sup>62</sup> Every soldier

in the company supported the defense because that was the companies' only mission. Not so the battery in a fire base since large portions of its manpower were required to conduct indirect fire. The fire direction center (FDC) and the howitzers required manning 24 hours a day. Mechanics and cooks have specific duties in support of the battery which must be alternated with the defense. There are few battery soldiers available whose only mission is defense. The battery was not trained in patrolling or moving under fire although the soldiers manual seemed to imply as much.<sup>63</sup>

The battery was still a potent force when the fire base was attacked even though maneuver forces played the dominant role.<sup>64</sup> Patrols and LP/OPs from the supporting maneuver force were positioned to provide early warning of enemy movement.<sup>65</sup> The first line of defense around the perimeter was individual infantrymen whose weapons were positioned to maximize interlocking fires. Machine guns (including the battery's if not otherwise used) were incorporated in the plan for defense as were other weapons such as the Quad .50 ADA system and the 90mm recoilless rifle.<sup>66</sup> The howitzers also had to be positioned and assigned sectors around the perimeter. Beehive ammunition and Killer Junior were the two techniques most favored in the defense but they were useless if the howitzer was positioned ineffectively.

FSB Maury I was established by the 25th Infantry Division (ID) with two 105mm towed batteries and one 155mm SP battery forming the points of a triangle (Figure 2).<sup>67</sup> Berms and fighting

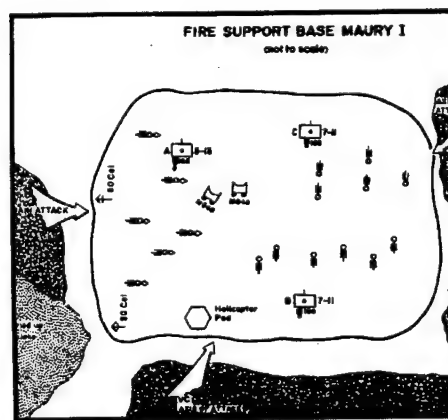


Figure 2

positions were poorly constructed if at all due to heavy rain. The enemy attacked the 155s with RPG's while the 105s were unable to counter with direct fire due to ineffective positioning. Two 105s were pushed towards the 155 battery, during the attack, in an attempt to relieve the pressure but it was too late. The higher silhouette of the 155 and its slow rate of fire made it an inappropriate choice for the perimeter.<sup>68</sup> All but one of the six howitzers was lost as were 10 US soldiers. An additional 66 were wounded compared to confirmed enemy killed of 18.

These lessons were learned and implemented by the 25th ID the next day at FSB Pike VI. Once again, the position was occupied by two 105mm towed batteries and a 155mm SP battery. This time, the 155s were dug in the center of the perimeter while two 105mm howitzers were positioned away from their respective batteries specifically to provide direct fire (**Figure 3**)<sup>69</sup> When the enemy attacked, a few reached the Quad .50s on the perimeter but the effective use of 105mm Beehive and Killer Junior broke the assault allowing the perimeter to be restored. No howitzers were lost and only 5 soldiers were killed. Another 30 were wounded while over 110 enemy bodies were found around the perimeter.<sup>70</sup>

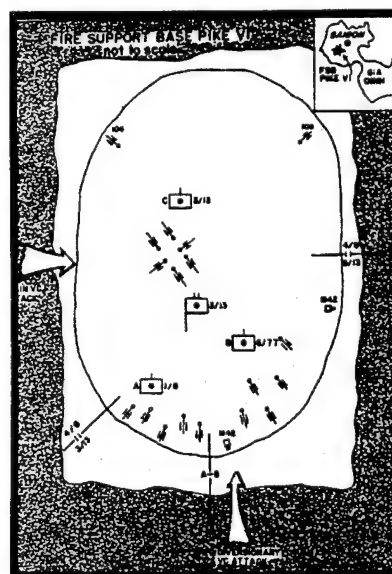


Figure 3

Although attack by large units continued to be the most dangerous threat, the small unit/sapper and stand-off attack became more common. Defense against these enemy tactics posed significant problems for the base commander. Often the attack of the

sapper was masked by a stand-off attack using mortars, rockets or RPG's. Defense against the stand-off attack consisted of seeking shelter in properly constructed positions with adequate overhead cover, aggressive patrolling of suspected mortar positions, and counter-mortar fire. The latter two techniques were not extremely successful since the enemy would often displace before their rounds impacted and there were many locations from which to fire.<sup>71</sup> Defense against the sapper, on the other hand, involved observation of the perimeter at all times, something made difficult if the perimeter positions were not effectively located.

To combat the combined sapper and stand-off attack, perimeter fighting positions had to be designed to observe the perimeter without sacrificing protection. The plan for establishing such defenses had to be thorough. After occupation, the manning and maintenance of these positions required constant attention and effort. The sapper spent days preparing for his attack. He looked for weak points and routines, prepared routes over several days, and conducted rehearsals aimed at allowing undetected access to the position. He would then attack while incoming rounds distracted the defenders and hid the noise of his movement.<sup>72</sup> There were two additional reasons the success of the sapper and stand-off combination; the sapper's limited objectives and the restrictions inherent in positions with overhead cover.

The sapper was not attacking to destroy everything on the position, only a select few items were targeted. The sapper remained in the position for only a short period of time thus limiting his exposure to reaction forces. The confusion resulting from the combination of explosions and incoming rounds served to fix the defenders in protective

shelters. The moral and psychological effect of a successful attack was expected to exceed the actual damage inflicted although the damage was significant.<sup>73</sup>

The number of fighting positions a company is capable of manning provides multiple belts of interlocking fire and observation. This is not the case when the battery has to defend itself, or any other unit within a perimeter not focused solely on the defense. As the fire bases became the rest and refitting location for companies, the security of these positions was balanced with soldier comfort type issues. This may explain the success of sappers against infantry defended perimeters during the later stages of the conflict.<sup>74</sup> Companies no longer manned the perimeter, a platoon did, yet the interlocking fires and observation were based on a company's worth of positions.<sup>75</sup>

Commanders responsible for establishing fire bases spent considerable time and effort in the planning and preparation for occupation. The first requirement was for the base to support the tactical mission.<sup>76</sup> The size of the position was affected by the number of firing units to occupy and whether the base had other missions such as logistics, aircraft repair, etc.<sup>77</sup> Obviously, the LZ established the minimum size for the position if the base was expected to accept a helicopter. Often, two LZ's were planned, one within the perimeter for a single ship and a second, larger one outside the perimeter for resupply when the base was not under fire. Occupants of the base were then positioned to maximize defensibility around the LZ. Physical dimensions of 21 fire bases surveyed in 1970 were "on the order of 75 meters by 150 meters, and square, round, or triangular in shape, although this may vary to take best advantage of terrain features."<sup>78</sup> Terrain was the next factor impacting the fire base. In the mountains, howitzers were positioned along

the crests of hills following natural terrain features. Formations like the star and circle were used to maximize defensibility in the valleys and lowlands since terrain was not as dominant.

Once a location was selected, it had to be improved to accept units and increase its defensibility. Helicopter inserted bull dozers and tree-buster demolitions reduced the trees and brush to create an LZ. The problem became one of flow control once the engineers had opened the position beyond a single ship LZ, especially in positions carved from the jungle. The planners had to manage which assets arrived over time to prevent a logjam on the LZ. The flow changed from security and engineers to battery personnel and equipment as the bull dozers widened the position and prepared howitzer berms. Finally, the arrival of ammunition and other logistics were intensely managed to limit its exposure to indirect fire and lessen the amount of movement around the LZ.<sup>79</sup>

Perhaps the most thorough description of the occupation process is described by Gen. John Hay in Vietnam Studies: Tactical and Materiel Innovations;

Construction usually started early in the day and proceeded according to the following steps. The exact position of the fire support base was selected and an engineer stake was driven at the center. A rope forty meters long was attached to the stake and stretched out from the center, forming the radius of the base and establishing the location of the bunker line...stakes were driven every 15° around the perimeter to mark the location of all twenty-four bunkers...the ideal number for a rifle company. Another circle was marked seventy-five meters out from the bunker line, thus establishing the location of the defensive wire barrier.

While the fighting bunkers were being constructed, bulldozers were busily digging holes for larger command and control bunkers inside the perimeter...The wire barrier was established using one row of triple concertina wire. The area between the bunker line and the wire barrier was then laced with claymore mines. The fire support base was completed when a Chinook helicopter flew in with a fully assembled, twenty-foot observation tower.<sup>80</sup>

The creation of the base involved the engineer, artillery and maneuver commanders as well as logisticians and aviators. All these individuals had significant input on the construction, occupation and manning of the position.<sup>81</sup> Multiple batteries were sometimes deployed without maneuver reinforcement in areas where the terrain was not as restrictive, and the mission more conventional. Artillery commanders, usually at division or higher level, attempted to relieve maneuver commanders of the requirement for protection by combining two or three batteries and augmenting them with ADA. Regardless of who occupied the fire base, the defense had to be planned to be successful and the planning had to incorporate everything and everyone on the base.<sup>82</sup>

### **OOTW**

The role of artillery in OOTW is still unclear. As precision increases, artillery may serve as the weapon of choice for the destruction of point targets.<sup>83</sup> Its increased range will support maneuver forces operating over larger areas. As in the past, artillery will continue to fire in defense of fixed locations such as check points. It may also serve as a deterrent to the warring factions. The presence of artillery may demonstrate that US forces are willing to employ it and other, less visible fire support means to accomplish their mission.<sup>84</sup> Field Manual 7-98 portrays artillery fires in OOTW as similar to those in conventional conflict although under more restrictive rules of engagement.<sup>85</sup> If deployments to Grenada, Panama, Somalia and Macedonia are any indication, this is certainly not the case.

Assuming that artillery is deployed, then it may become a target for enemy attack. The TOE states that the battery is organized and equipped to delay all threats and defeat



most minor ones.<sup>86</sup> Battery defense becomes much more important given that success on today's battlefields is measured by an almost complete lack of casualties.<sup>87</sup> Maneuver commanders at the Joint Readiness Training Center (JRTC) expect the battery to defend itself from most threats and when it can't, its value during OOTW is lessened.

Since the battery is often stationary and accessible to both population and media, it becomes the target of choice second only to the logistic bases for enemy attack (if the OPFOR at JRTC are any indicator). Batteries are often collocated with the logistics base at the training center to strengthen their mutual defenses. The size of the perimeter, sometimes measured in kilometers, and lack of understanding of the defense usually causes this technique to be unsuccessful.

Defense against the various threats outlined in FM 7-98 hinges on understanding the threat and preventing his access to the position with an effective perimeter. The Center for Army Lessons Learned (CALL) has stressed the need for effective perimeter defenses in its OOTW bulletins. At the same time, it identifies a requirement for increased training in barrier construction, especially among non-maneuver forces.<sup>88</sup> What is not emphasized is the relationship between the size of the position, the material requirements, and construction time. Also not examined by CALL is the conflict between overhead cover and fields of fire. The need for positions with overhead cover is stressed, but its impact on fields of fire is not. The perimeter must be constructed rapidly and efficiently to reduce the vulnerability of the occupants as quickly as possible. This is difficult to do if planners can not accurately anticipate the material requirements for a given size position or if they allow material to be diverted to other uses.<sup>89</sup>

Vehicular attack by car bombs or drive-by shootings are less significant threats to leaders preparing for conventional conflict. In OOTW, just one lapse in defense, such as the Marine Barracks bombing in Beirut, is extremely significant.<sup>90</sup> Protection against vehicular threats is simplified by identifiable avenues of approach into the position. According to FM 6-50, batteries are supposed to identify mounted avenues of approach and erect barriers.<sup>91</sup> What actually constitutes an effective obstacle is not explained. Often at the JRTC, an entry point guard, a single strand of concertina, and a machine gun position are the barrier. A determined enemy could easily drive past or through the guard before the machine gun reacts.

The U.S. is not the principal combatant in most OOTW situations and therefore may not be a primary target for the combatants. Batteries, however, must still be capable of defeating small units and lessening the effects of stand-off attacks. This is because the mission can change from peace keeping to peace enforcement or armed conflict quicker than effective defenses can be constructed. The barrier and construction materials required to defend against these threats is extensive and will probably not be high in the priority of flow. As the 10th Mountain Division found in Somalia, additional material may never show up or could be diverted on arrival.<sup>92</sup> The Able Sentry task force in Macedonia is using over 2500 rolls of concertina around their base.<sup>93</sup>

Batteries deploy to OOTW situations with serious restrictions in manpower. The howitzer crew is now seven instead of nine and the FDC is smaller as a result of automation. The service and support soldiers have been consolidated at battalion and very few are deployed with the battery.<sup>94</sup> Units arrive at the JRTC full strength only because of

the cross-attachment of soldiers from non-deploying units. If these units deployed simultaneously, this would not be possible. The howitzer can be manned by a reduced crew making additional soldiers available for the perimeter. With only seven men, however, there is not much crew to reduce. Additional units are sometimes collocated with the battery, but the tendency is to increase the size of the position negating the increase in man power. The task force base in Macedonia has a 2400 meter perimeter that the 121 man Headquarters Company has difficulty defending.<sup>95</sup>

In OOTW, the battery will probably not fire as much as it did in Vietnam. The battery deployed to Somalia never fired a round. During the OOTW phase at JRTC, batteries fire very few rounds. Restrictive rules of engagement and clearance procedures will severely impact the responsiveness of artillery and volume of fire. This should allow batteries to focus on survivability as much as indirect fire. Fire missions take 10-15 minutes to approve and execute at the JRTC. Soldiers in defensive positions could return to the howitzers within this time.

Units deployed in OOTW situations are often assigned positions or assume positions occupied by the relieved unit. The Able Sentry task force had to take over Scandinavian observation posts on the border. The Scandinavian positions could not be adjusted due to UN restrictions even though they were not situated for defense. Political necessity may require that artillery batteries position within certain areas. The commander should not compound a poor position assignment with an ineffective defense.

The Able Sentry task force immediately began planning the defense when it was assigned a base area in Macedonia. The battalion created a secure perimeter from which

to operate although other UN forces did not understand its reasoning. The task force installed vehicular obstacles and observation towers within a concertina wire perimeter. Lighting was planned around the base and buildings near the perimeter were not used. There was a constant guard force and reaction force and the Military Police manned the base entrance although this reduced the number of soldiers patrolling the surrounding area. The task force was limited in the number of soldiers it could deploy by U.N. restrictions.<sup>96</sup>

OOTW situations seem to develop quickly.<sup>97</sup> Train-up for the mission will be limited and therefore certain fundamentals should be common knowledge. There is insufficient time to train for both the OOTW missions and force protection prior to deployment. The requirements for shipping of equipment and changes in mission limited the Able Sentry task force training to mission requirements only. Batteries deploy to the JRTC and occupy positions the same as they did at home station although things are obviously different at the training center. Battery commanders often reported that they did not have time to train for both the conventional and OOTW requirements.

Batteries may have to occupy positions with other units or nations. In Somalia, many elements occupied the airfield at Mogadishu. There was little unity of command for base defense although the UN was supposedly in control.<sup>98</sup> Coordination between various units was hampered by language and custom as well as differences in national values.<sup>99</sup> In Macedonia, the Scandinavian forces felt US defensive preparations were provocative. The Scandinavian base defense was a single gate manned by two soldiers with no perimeter wire, guards, or patrols.<sup>100</sup> Right or wrong, force protection carries different connotations

between nations which must be dealt with by the commander.

OOTW situations are characterized by change and uncertainty but the defense of the position is a mission which must be controlled and planned if it is to be successful. There will be no acceptable excuse for poor execution should a battery be given the mission of defending itself. The battery has the assets to defend itself, although there is a cost. The commander must maximize all the men and systems available for defense, as difficult as this is, given the diverse units and unclear command and control system possible in OOTW. Force protection is one of the primary considerations in OOTW and the perimeter defense is an integral part of this mission.<sup>101</sup>

## **IV. Impact on Doctrine, Organization, Materiel, and Training**

### **Doctrine**

Joint Pub 3.10, Joint Tactics, Techniques, and Procedures (JTTP) for Base Defense, is the doctrinal standard for defense of bases occupied by multiple units.<sup>102</sup> Field Manual 6-50 identifies considerations for battery defense in both conventional and unconventional conflict. The Marines FMFM 8-2, Counterinsurgency Operations provides an excellent guide to the considerations for the Vietnam type fire base. Base defense planning, however, needs a more thorough examination. Above the battery level, a list of considerations reminds leaders of the overall perimeter purpose and concepts. The relationship of the elements of the defense is not, however, examined in enough detail. Even FM 7-10, The Infantry Rifle Company is too broadly focused to allow analysis of the relationships inherent in perimeter defense. Planners and executors must develop a thorough knowledge of the systems available, manpower required, and enemy tactics. No

single doctrine can cover every contingency, but the interrelationships of the elements of a perimeter should be available to the commander in some form, not assumed to be common knowledge.

Field Manual 6-50 has likened the perimeter to a strong-point defense.<sup>103</sup> The artilleryman should, therefore, plan and prepare following the steps used by maneuver commanders. The maneuver commander develops a rough concept of the defense during the planning phase, before occupation. He does this by assessing the size of the perimeter to be defended, identifying where the perimeter is most vulnerable, and assigning subunits to cover planned sectors.<sup>104</sup> The maneuver commander understands the area each subunit can effectively defend given their systems capabilities, anticipated terrain, and threat.

How large an area can an artillery battery defend? Before the commander can begin to plan for the defense, he must be familiar with the doctrinal basics. The infantry commander plans two levels down and therefore plans the positioning of squads. Field Manual 7-8, The Infantry Platoon and Squad states that a squad can occupy approximately 100 meters of ground and defend a frontage of 200 to 250 meters.<sup>105</sup> This is accomplished by five, 2-man fighting positions approximately twenty to twenty-five meters apart in a Lazy W formation facing the enemy. The distance at which fires interlock is based on hand grenade throwing range. The doctrinal direct fire defense, therefore, consists of two-man fighting positions firing at 45 degree angles and interlocking 35 meters to the front of adjacent positions.<sup>106</sup> The leader planning the defense must understand these basics before he can adapt the fighting positions and frontages to a particular position.

The battery, unlike the squad, can not focus on a single direction of attack. Field

Manual 6-50 recommends the diamond and star formations since they supposedly maximize all-around firing capability and battery defense.<sup>107</sup> Terrain positioning, circular and triangular formations were also used by units in Vietnam. The circular formation is the one most used at JRTC and it illustrates the difficulty in arranging fighting positions around a perimeter.

The arrangement and construction of perimeter fighting positions is the next key element the planner must consider. The doctrinal, two-man fighting position defined in FM 7-8 and FM 5-103, Survivability, imposes several restrictions impacting the defense. Primarily, it restricts the sectors of fire and requires adjacent positions for protection. The fighting position is one of the most restrictive elements of the defense.

Toward the end of the Vietnam war, there was a spirited debate within the Infantry community over the standard fighting position.<sup>108</sup> The

1st Cavalry Division two-man position, pioneered by its commander, then LTG DePuy, became the standard position which remains the standard today.

There was debate over its relative merits at the time that bear reexamination.<sup>109</sup> The position does provide

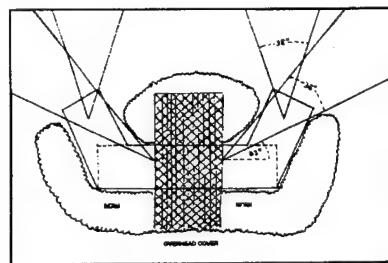


Figure 4

excellent overhead cover and interlocking fires. The front and side parapets protect the soldier from frontal fire while exposing the attacker to flanking fires from adjacent positions.<sup>110</sup> Occupants of the foxhole, however, can not see to their front and have to rely on adjacent positions for both warning and protection. The infantrymen who disliked the position said the reliance on other positions caused them the greatest concern.

Soldiers were found fighting from outside or on top of their positions rather than rely on other positions for protection. The number of hours of labor required to build the position was also a problem. Infantry companies in Vietnam, like artillery batteries, moved often. After marching for hours, they had to work an equal or longer amount of time to build their fighting position.<sup>111</sup> Crew-served weapons are difficult to emplace in the covered positions, especially when using tripods.<sup>112</sup> Still, the Army adopted the DePuy foxhole as the standard two-man position with one modification. The soldier extends the firing position into a U-shape when he needs to see to the front (**Figure 4**). The U-shaped position does, however, expose the soldier to the attack both from the front and side since the firing port is much larger.<sup>113</sup> Field Manual 6-50 states that the two-man foxhole with overhead cover is desired although the inherent restrictions are not explained.<sup>114</sup>

The planner should remember that many variables are adjustable. Deciding where to accept risk can only occur after the doctrinal basis for the defensive is understood. The interval between positions may be increased to maximize the range of weapons if the terrain permits. Positions may be closer together to defend a likely avenue of approach against different threats. Fighting positions can be prepared with less or no overhead cover thus allowing greater observation and fields of fire when indirect fire is not a significant threat. The key is an understanding of the fundamentals as a point of departure.

According to FM 7-8, an ideal formation consists of two-man-covered foxholes engaging targets at 50 meters. Interlocking fires from flank positions occur 35 meters in front of the fighting position. The first perimeter has only six, two-man fighting positions



based on the minimum generally observed at JRTC.

The resulting circular perimeter is only 50 meters in diameter with 360 meters of wire at hand grenade range of 35 meters. As **Figure 5** clearly shows, six positions do not provide very good interlocking fire. Large sections of the perimeter, inside the wire, are uncovered by any fighting position. There is only one area of interlocking fires protecting the fighting positions

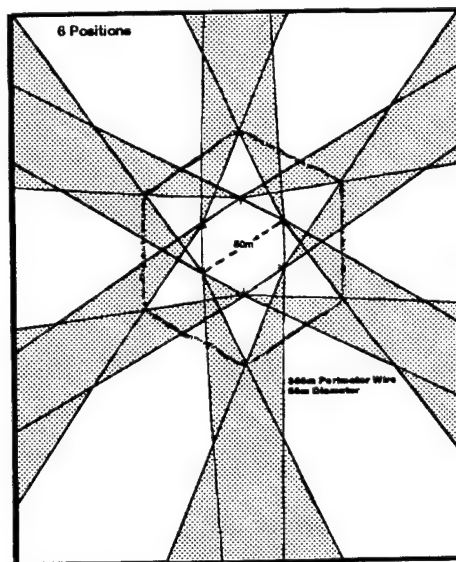


Figure 5

rather than the belts which appear as the number of positions is increased. This is the reason one Vietnam era battery commander spoke of assigning his primary direct fire sectors to cover the “blind alleys” caused by the DePuy foxhole.<sup>115</sup> The entire perimeter could be covered if the sectors of fire were widened, but the occupant of the fox hole would be more exposed as a result.

Going from six to eight fighting positions increases the diameter to 65 meters and perimeter wire to 400 meters but does not appreciably increase the area of interlocking fire or decrease the dead space within the wire. A second area of interlocking fires occurs at a range of 175 meters when the number of positions is increased to ten. This allows two positions on each flank to engage an attacking enemy soldier. Dead space around the 80

meter position is only 30 meters out of the 480 meters of wire. **Figure 6** shows the protection provided by twelve positions. The diameter has increased to 100 meters and the length of the perimeter wire is 500 meters. Dead space along the wire is almost eliminated while the second area of interlocking fires occurs at only 125 meters. Sixteen fox holes provide a position of 130 meters in diameter with 640 meters of perimeter wire. Fires interlock the second time at 100 meters with a third interlocking area at 300 meters. Dead space is minimized, even

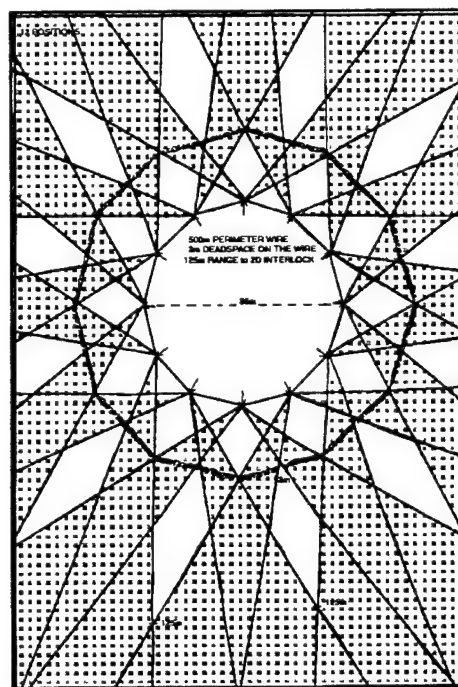


Figure 6

beyond the wire. As more positions are added, the direct fire coverage obviously improves, but the battery cannot man this number of positions without help.

It is unrealistic to assume that the battery would construct positions with such geometric accuracy. The analysis of the interlocking fires is useful, however, since it highlights the restrictions imposed by the two-man position. A key weapon intentionally omitted is the howitzer itself. The howitzer is an extremely effective means of engaging targets at and beyond the perimeter wire using either Beehive or "killer junior." The reason it was not included is that the weapon may not always be available for the defense. The crew must expose itself to the direct fire of the enemy to operate the weapon. The battery commander must have positioned the howitzer like the machine gun to cover a

sector of fire. An additional consideration is the protection required for soldiers in positions to the front of the howitzer.<sup>116</sup> Political or tactical restrictions may also affect the employment of the howitzer in a direct fire role.<sup>117</sup>

Most units at JRTC, construct a 1-2 meter berm around each howitzer to protect the crewmen. The proposed firebase in the draft annex of FM 6-50 shows each howitzer and its prime mover positioned in a keyhole shaped berm.<sup>118</sup> The prime mover is lowered to allow the howitzer to fire over the vehicle. An obvious problem with the berm is its interference with the sectors of fire of both individual weapons and howitzers. The berm must be lowered in the howitzer direct fire sector which decreases its protection. This is another aspect of planning which must be planned before, and adjusted after, occupation.

A commander using a triangular formation might arrange his battery as depicted in **Figure 7**. This shows the integration of both howitzer and small arms direct fire sectors. The commander should analyze how the enemy will attack the position during planning.<sup>119</sup> The enemy is attacking a frontally-bermed fighting position protected by the flanking fires of two adjacent

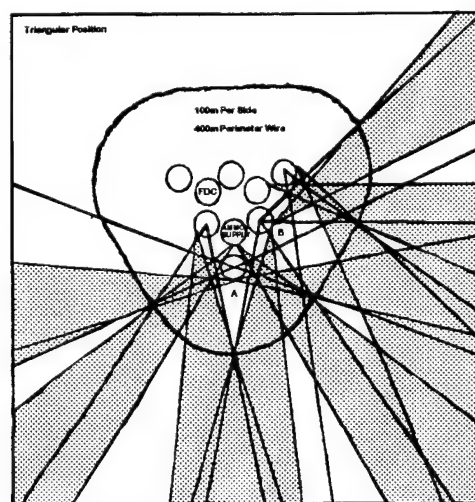


Figure 7

positions if he attempts to force the wire at a vertex [A]. He has to traverse several hundred meters of interlocking direct and indirect fires from the positions on the flank vertices to attack a side of the triangle [B]. Dead space along the perimeter wire is covered by the inner positions. The enemy would have to both suppress the flank and

overwhelm the center positions for an attack to be successful. Triangular formations in Vietnam ranged from 50 meters to 200 meters on a side as opposed to the 100 meters depicted above but again were often occupied by more than a battery.<sup>120</sup> One of the drawbacks of the triangle is a range to target at the wire of 75 meters. This illustrates an adjustment of the doctrinal position to accommodate a limitation in the number of perimeter fighting positions.

The commander must have a tentative plan to rapidly position systems and define sectors before the occupation. The fact that berms and fields of fire are not in their final state compounds the problems of laying out a perimeter before occupation. Sectors of fire as viewed from even a meter above the ground are completely different than the view from ground level. The howitzer berm not only protects the crew; it also blocks their fields of fire and vision. Moving a fighting position or howitzer once preparations have begun is difficult at best. Position construction may be inefficient and uncoordinated without planning.

The defense must be given the same attention as indirect fire in OOTW situations. Artillery's role in OOTW depends on its survivability. Field Manual 6-50 should address this in a planning process which occurs prior to the RSOP. The artillery commander must be a part of the planning process whether the battery is by itself or protected by other forces. There is a difference in positioning for direct fire and indirect fire which implies a difference in the planning and occupation procedures of the battery.

## Organization

The commander, with an understanding of the perimeter, must develop a plan appropriate for his unit. A light artillery battery, as currently organized, has six howitzer sections of seven men each. The battery also has a six-man FDC and five to ten additional supporting personnel for a total of sixty-six assigned.<sup>121</sup> Except for a few support personnel, the majority of the soldiers manning fighting positions come from the gun line. The Technical Manual for the howitzer shows crew drill down to six soldiers. The minimum number required to fire the howitzer is three but effectiveness is obviously lowered.<sup>122</sup> Most units rotating through JRTC set the minimum safe manning at five men which releases two soldiers for other duties. Battery survivability could be increased if a less responsive system is acceptable to the maneuver commander. The battery could man more positions by reducing the number of ready howitzers and applying the resulting manpower to the perimeter. There may be a reduction in responsiveness, but if the commanders' priority is force protection, this may be acceptable.

Arguably every soldier would defend the perimeter when attacked. This would imply that the battery should construct enough fighting positions for every soldier. It is, however, the number of positions constantly manned which is of greatest importance when planning the defense. The commander must plan his defense based on where and when he anticipates observing and engaging the enemy. The sapper in Vietnam attempted to initiate his attack from inside the perimeter. This could only have been possible if he avoided detection from the perimeter fighting positions and observation towers.<sup>123</sup>

Batteries at JRTC generally occupy eight, two-man positions continuously while reducing

the soldiers on their howitzers and in the FDC. Other positions can and should be prepared to augment these if the situation dictates, but the plan must hinge on what is feasible, not the maximum possible.

Many of the bases occupied by artillery units in Vietnam had ADA or other weapons assigned to assist in defense. These additional soldiers should increase the number available to man the perimeter. The artillery unit must still actively participate in the planning and execution of the perimeter defense. The howitzer should be assigned sectors of fire and the batteries, individual and crew-served weapons integrated into the defense.

The artillery platoon may be too small to effectively defend itself without assistance. A battery, keeping two howitzers ready to fire, frees 28 soldiers to man the perimeter. The platoon constantly manning two howitzers only frees 14 soldiers for the perimeter. The smaller position occupied by the platoon, while possibly more defensible, will not compensate for a shortage of personnel.

### **Materiel**

Barrier material and Class IV are also limitations affecting the security of the perimeter, especially early in a forced entry or force projection operation. Appendix A contains an example of the material required for various barriers. This material will not be present, however, without prior planning. Proper installation is also an imperative if the obstacle is to contribute to the defense. A single strand of concertina is quite often called a barrier at the CTCs.<sup>124</sup> The length and location of the perimeter wire are a direct result of the position's size. Wire must serve as a barrier so the fighting positions can defeat

attackers. Wire may also be used to secure a second, inner perimeter or channelize attackers as they approach the perimeter.<sup>125</sup> The commander must assess the availability of Class IV in his plan for occupation. The position to be occupied can then be selected based on the maximum size of the perimeter wire available, and number of fighting positions the unit can construct and man.

Key to an effective defense in Vietnam was first the selection of defensible terrain which supported the tactical mission, then establishing and maintaining the fields of fire around the position. Engineers were a critical element in the establishment of the base. Position selection was not limited to areas with natural fields of fire since several methods were available to clear them.<sup>126</sup> This may not be possible in the next conflict and is definitely not at the training centers.<sup>127</sup> Available assets and political considerations may restrict the clearing of fields of fire. Batteries at JRTC seldom receive engineer support long enough to create berms, construct defensive positions, and clear fields of fire. The commander must assess any restrictions in clearing fields of fire during planning so the occupation can maximize the defensibility of the terrain.

A major consideration on the use of engineers is the building of protective berms for the howitzers and equipment. According to the Final Report: Fire Support Base Defense, a study conducted by the Army Concept Team in 1972 of 21 fire bases, batteries were required to have berms before the end of the first day.<sup>128</sup> Berms were also used between howitzer positions to prevent enemy direct fire from sweeping the middle of the position.<sup>129</sup> One significant difference between battery positions in Vietnam and those at the JRTC is the absence of prime movers.<sup>130</sup>

At JRTC, light artillery crews use the prime mover to store ammunition leaving additional rounds on the ground or under canvas covers.<sup>131</sup> Taking the ammunition off of the vehicles, as was done in Vietnam, could be beneficial in several ways. First, the vehicles could be used to move supplies, casualties, or logistics. Second, it reduces the possibility of secondary explosions from standoff attacks since ammunition is much more susceptible to fire than to indirect fire.<sup>132</sup> Lastly, the lack of vehicles reduces the number of berms and the required engineer effort.

At the JRTC, overhead protection is built over the perimeter fighting positions but seldom anywhere else. One of the standards for units occupying fire bases in Vietnam was for every occupant to have overhead cover by the end of the first night.<sup>133</sup> The distinction between overhead cover for soldiers and fighting positions with overhead cover is significant. Everyone needed to have a place to go in case of incoming rounds. The fighting positions might get overhead cover at a later time, if at all. Soldiers within the perimeter are more vulnerable than those in fighting positions since they are generally above the ground. The battery might plan for conex's which can be sand-bagged to protect the FDC or as sleeping bunkers.<sup>134</sup> They might also request similar materials for ammunition bunkers or fighting positions.

### **Training**

Successful base defense in OOTW situations requires in-depth planning and coordination between all the occupying elements. This is not something which can be accomplished after the units arrive at the selected location, especially when units come from different services or nations. Joint Pub 3.10 provides the considerations for planning



in the joint environment.<sup>135</sup> The Battery commander must plan the defense in much greater detail if the battery must defend itself. The plan will suffer if the fundamental relationships of the defense are not understood and trained.

A list of considerations does little to define what is required to defend a perimeter. The relationships between observation and fields of fire, overhead cover, obstacles and weapons capabilities must be understood by planners before occupation. This is even more of a challenge since interlocking fields of fire are not intuitively obvious around a circular perimeter. The best way to develop an understanding of static defense is through repetitive training prior to deployment on various types of terrain against a variety of threats.

There are two basic defensive techniques for artillery; tight positions and perimeters, and mobility and dispersal. Starting with the leader development programs at Fort Sill, both methods of defense must receive equal training and emphasis.<sup>136</sup> As Somalia demonstrated, no particular type artillery unit is more likely than another to deploy to OOTW situations. Making the perimeter smaller, however, does not automatically make the position more defensible. Leaders must be trained in the fundamentals of static defense, then practice and train these techniques as a METL task.<sup>137</sup>

Fort Sill developed a training program for leaders deploying to Vietnam in 1967. They built two fire bases, practiced occupations using non-linear formations, and studied base defense. This training was not fully implemented, however, until 1969, 4 years after units began deploying. It was obviously viewed as less important than the training required for conventional operations.<sup>138</sup> Modern leaders do not have four years to decide

if they should train for a particular type of conflict, they should be training now.

## **V. Conclusions**

The perimeter defense is influenced by many factors such as; Class IV, Engineer assets, time, and the size of the position selected. Many leaders do not understand the relationship between the size of the position and the capabilities of weapon systems available. Individual and crew served weapons are ineffective when improperly positioned. The howitzer may not be able to engage targets to its front because of incorrect berm construction. Battery leaders cannot develop a plan for an effective perimeter which maximizes all the systems and capabilities available without an understanding of the doctrinal basics.

The Army has defeated various threats by using well prepared perimeter defenses many times in the past. Due to a conventional threat in central Europe, however, the artillery focused on defending by dispersal and mobility. The knowledge required to plan and execute a perimeter defense is no longer present in most units or trained in the Field Artillery education system. Battery commanders are not prepared to perform the level of detailed analysis required to plan a perimeter defense.

Effective perimeter defense results from balancing the need for observation and fields of fire with that of overhead cover and interlocking fires. The size of the perimeter is based on threat, number of fighting positions, and the requirements for LZs and equipment. The availability of engineers, barrier material, and time serve as limiting factors. Successful perimeter defenses in Vietnam were thoroughly planned, before occupation. The perimeter is not as well defended if the plan occurs after occupation.

This is because the howitzers occupy to provide indirect fire first, then direct fire. The individual positions are tied to the howitzers rather than the perimeter and when the berms are pushed up, the ability to interlock fires becomes nearly impossible.

The perimeter defense varies most based on the soldiers available to man it. Companies in Vietnam could man 24 fighting positions around perimeters only 80 meters across. An artillery battery can occupy that number of positions only if everyone manned a position, something impossible if the howitzers have to be fired. Contrary to FM 6-50, the battery perimeter is not the same as a strong-point defense. When maneuver forces defend, they do so as the primary mission. When artillery defends, it is secondary to indirect fire.

Because the artillery will be stationary, it provides a target of opportunity to many of the threats inherent to OOTW. The mission of the US forces could be jeopardized if the battery does not adequately defend itself. The commander charged with defending a perimeter must begin with a plan. His plan must include all the systems and personnel available and account for the most likely enemy threat. The size of the position he occupies must account for the type of fighting positions he plans to man on his position and the barrier materials available to protect his position. The enemy will be forced to find other targets when faced with a well executed perimeter defense.

## Appendix A

Example Barrier Material packages pre-planned and palletized by the 25th ID (L).<sup>139</sup> Note that none of these lists include staples, which hold the barrier onto the ground.

1. 300m Triple Standard Concertina (NSN: 5660-B ARFEN300M3)	Item	Qty
	Pickets, Long	160 ea
	Pickets, Short	4 ea
	Barbed Wire (Roll)	3 slings
	Concertina (Coil)	59 ea
	Hammer, 8lb Sledge	4 ea
	Gloves, Barbed Wire	8 pr
	Sandbags	10 hundred
2. 100m 4x2 Double Apron Fence (NSN: 5660-B AR4x2100MA)	Item	Qty
	Pickets, Long	34 ea
	Pickets, Short	68 ea
	Barbed Wire (Roll)	5 sl
	Hammer, 8lb Sledge	4 ea
	Gloves, Barbed Wire	4 pr
	Sandbags	10 hd
3. 100m 6x3 Double Apron Fence (NSN: 5660-B AR6x3100MA)	Item	Qty
	Pickets, Long	22 ea
	Pickets, Short	44 ea
	Barbed Wire (Roll)	5 sl
	Hammer, 8lb Sledge	4 ea
	Gloves, Barbed Wire	4 pr
	Sandbags	10 hd
4. Concertina Wire Roadblock (NSN: 5660-B ARROADBLKC)	Item	Qty
	Pickets, Long	30 ea
	Pickets, Short	20 ea
	Barbed Wire (Roll)	2 sl
	Concertina (Coil)	10 ea
	Gloves, Barbed Wire	8 pr
	Sandbags	10 hd

## Endnotes

1. FMFM 8-2, Counterinsurgency Operations, JEL, 119.
2. TRADOC Pam 525-5, Force XXI Operations (Washington, D.C.: US Government Printing Office, 1994), 2-4.
3. Ibid., 3-22.
4. Field Manual (FM) 6-50, The Field Artillery Cannon Battery (Washington D.C.: US Government Printing Office, 1990), 3-16.
5. The last five JRTC rotations involving artillery each had at least one comment (usually more) on some aspect of battery defense. Everything from M60 positioning to conduct of the defense to range cards and defensive diagrams.
6. Field Manual (FM) 100-7, Decisive Force: The Army in Theater Operations (Washington D.C.: US Government Printing Office, 1995), 8-4.
7. Brian M. Jenkins, International Terrorism and the Other World War (The United States Naval War College, 1985), 8.
8. Sara Sewall, "Peace Support and the United Nations," in Peace Support Operations and the U.S. Military, ed. Dennis J. Quinn (Washington D.C.: National Defense University Press, 1994), 106.
9. Charles S. Kellar, The Roles and Functions of Fire Support in Peace Operations (Fort Leavenworth, KS: Command and General Staff College, 1994), 4.
10. Edward E. Hoffer, Field Artillery Fire Support for Contingency Operations: Combat Power or Counterproductive? (Fort Leavenworth, KS: Command and General Staff College, 1987), 39.
11. III Marine Amphibious Force, Fire Support Base Development, 8, 1969.
12. This issue of control of fires around a perimeter was raised during Vietnam by some authors in branch related publications (See Kelley, "Defense of a Landing Zone"). The need for doctrinal solutions, however, was not captured.
13. FM 6-50, The Field Artillery Cannon Battery, 2-1, 3-5.
14. Ibid., 3-3.
15. Eliot A. Cohen, "What to do About National Defense," Commentary, November, 1994, 6; David E. Ott, Field Artillery, 1954-1973 (Washington, D.C.: Department of the Army, 1975), 40.

16. Interestingly, the same threat model was used prior to Vietnam as that after the war according to FM 30-101, Aggressor: The Maneuver Enemy, versions 1961 and 1972. Largely infantry based armies as 525-5 predicts have not been the threat model at least since before Vietnam.
17. Field Manual (FM) 100-2-1, Soviet Army Operations and Tactics (Washington D.C.: US Government Printing Office), 9-23.
18. FM 6-50, The Field Artillery Cannon Battery, 3-1.
19. The Field Artillery Journal is a constant source of banter over how to best protect the MLRS. In the September 95 issue alone, one officer talks about how FM 6-60, TTP for MLRS requires that an MLRS *Platoon* be allocated 3km of space to maneuver yet the author contends it is not survivable using this technique nor is there this much space available. Later in the same issue, a unit that had just completed a Korea scenario BCTP comments on their use of maneuver forces to protect the vulnerable launchers.
20. TRADOC, Battlefield Framework White Paper (1994), 4.
21. Field Manual (FM) 90-14, Rear Battle (Washington, D.C: Headquarters, Department of the Army, 1985), 4-2. Rear area units were not expected to defeat Level II threats which included unconventional operations (page 1-2) but they were expected to delay them on the perimeter until a TCF could be dispatched. Understanding that success for the base is limiting their casualties and losses, not destruction of every attacker.
22. FM 6-50, The Field Artillery Cannon Battery, 2- 1.
23. Ibid., 1-3 to 1-9.
24. Based on discussions with current Field Artillery Officer Advance Course instructors during October 1995.
25. FM 6-50, The Field Artillery Cannon Battery, 2-1.
26. Ibid., 2-1.
27. Ibid., 2-6.
28. Ibid., 2-4 and 2-5.
29. Ibid., 2-3.
30. Ibid., 2-9 to 2-12.
31. Ibid., 3-2.

32. FMFM 8-2, Counterinsurgency Operations, 119; III Marine Amphibious Force, Fire Support Base Development, 4.
33. FMFM 8-2, Counterinsurgency Operations, 119-21.
34. Field Manual (FM) 7-8, Infantry Rifle Platoon and Squad (Washington D.C.: US Government Printing Office, 1992), 2-80.
35. FM 6-50, The Field Artillery Cannon Battery, 1-1.
36. Floyd V. Churchill, "Battery Perimeter Defense - The Last Resort," Field Artillery Journal 47, no. 5 (September-October 1979). This was the gist of many of the conversations I had with senior leaders during their visits to the batteries I observed at JRTC. They often complained that the defense of the perimeter without additional manpower was not doctrinally correct. As I have shown, however, there is no mention of maneuver forces defending batteries in our current doctrine. The battery can do a much better job of defending itself than they have currently demonstrated.
37. Arthur L. Kelley, "Defense of a Landing Zone," Artillery Trends 39: 46-47.
38. R.C. Davis and H.W. Brazier, "Defeat of the 320th," Marine Corps Gazette 53, no. 3 (March 1969): 26.
39. Robert H. Scales, Firepower in Limited War (Washington, D.C.: National Defense University Press, 1986), 4.
40. John H. Hay, Vietnam Studies: Tactical and Materiel Innovations (Washington D.C.: Department of the Army, 1974), 149.
41. Jonathan B.A. Bailey, Field Artillery and Firepower (Basingstoke, UK: Taylor & Francis (Printers), 1989), 46.
42. Army Concept Team in Vietnam, Final Report: Fire Support Base Defense, Report by Army Concept Team in Vietnam (1972), II-7.
43. Julian J. Ewell and Ira A. Hunt, Sharpening the Combat Edge: The Use of Analysis to Reinforce Military Judgement (Washington, D.C.: Department of the Army, 1974), 37.
44. Field Manual (FM) 6-20-1, Field Artillery Tactics (Washington D.C.: US Government Printing Office, 1965). Little consideration of what the enemy will do to the artillery is incorporated in the manual, the focus was and continues to be what the artillery will do to the enemy.
45. Field Manual (FM) 6-140, Field Artillery Cannon Battalions and Batteries, (Washington D.C.: US Government Printing Office, 1965).

46. S.L.A. Marshall and David H. Hackworth, Vietnam Primer - Lessons Learned, (Sims, AR: Lancer Militaria, 1967), 45-46. The authors commented on how US forces do not put their LP/OPs far enough from the perimeter to provide early warning although the commander thinks they are and is therefore lulled into a false sense of security.
47. US Military Assistance Command, Vietnam, "Counterinsurgency," Lessons Learned No. 62, (11 March, 1967), 23.
48. Richard E. Cavazos, Martin D. Howell, Christopher B. Sinclair, William J. Livsey, Donald J. Majikas, and Ardie E. McClure, Analysis of Fire and Maneuver in Vietnam: June 1966 - June 1968, (Carlisle Barracks, PA: US Army War College, 1969), II-206.
49. Joseph E. Hacia, Interviewed by Michael D. Keating (Tay Ninh Province, RVN, 30 June 1969), 8. MAJ Hacia was the commander of the elements on FSB Crook during the attack.
50. US Field Artillery School, "Artillery Organizations," Artillery Trends 41: 57-77.
51. Field Manual (FM) 90-14, Rear Battle (Washington, D.C: Headquarters, Department of the Army, 1985), 4-2.
52. Cavazos, Analysis of Fire and Maneuver in Vietnam: June 1966 - June 1968, II-31.
53. Ott, Field Artillery, 1954-1973, 184-88.
54. Lex McAulay, The Battle of Coral, (Victoria, Australia: Century Hutchinson Australia Pty Ltd, 1988), 59.
55. Ibid., 1-59.
56. Ibid., 59-119.
57. Ibid., 194.
58. Ott, Field Artillery, 1954-1973, 60.
59. Lloyd J. Picou, "Airmobile Artillery in Combat," Artillery Trends 38: 17; Trevor W. Swett, "Tips to Senior Commanders," Infantry 57, no. 6 (November-December 1967): 34.
60. Hay, Vietnam Studies: Tactical and Materiel Innovations, 150.
61. Army Concept Team in Vietnam, Final Report: Fire Support Base Defense, II-8.
62. Hay, Vietnam Studies: Tactical and Materiel Innovations, 47.
63. Field Manual (FM) 21-75, Combat Training of the Individual Soldier and Patrolling (Washington D.C.: US Government Printing Office, 1962). Fully half the manual focused on



patrolling and infantry squad tactics; S.L.A. Marshall, "Interview with Infantry Magazine on Infantry Operations in Vietnam," Infantry 60, no. 2 (March-April 1970): 9. He states that it is too much to assume that US soldiers can just go out and out-guerrilla the VC implying that dismounted patrolling is not something done naturally.

64. Cavazos, Analysis of Fire and Maneuver in Vietnam; June 1966 - June 1968, II-23.
65. Army Concept Team in Vietnam, Final Report: Fire Support Base Defense, II-41.
66. Ott, Field Artillery, 1954-1973, 60.
67. Ibid., 162.
68. 25th Infantry Division Artillery, "Operational Report - Lessons Learned, Period Ending 31 July 1968" (15 August, 1968), 5-6.
69. Ott, Field Artillery, 1954-1973, 164.
70. 25th Infantry Division Artillery, "Operational Report - Lessons Learned, Period Ending 31 July 1968," 13-15.
71. John C. Love, "Artillery Ambush," Marine Corps Gazette 52, no. 7 (July 1968): 36-42.
72. US Military Assistance Command, Vietnam, "Countermeasures Against Standoff Attacks," Lessons Learned 71 (13 March, 1969), 54.
73. Frederick P. Peterkin, "The Sapper," Infantry 59, no. 6 (November-December 1969): 51-53.
74. Robert J. Keivit, Interviewed by Robert G. Sausser (Carlisle Barracks, PA, 1984), 22. Officer was a battery commander in Vietnam in 1970.
75. Swett, "Tips to Senior Commanders," 34.
76. Army Concept Team in Vietnam, Final Report: Fire Support Base Defense, II-4 to II-5.
77. III Marine Amphibious Force, Fire Support Base Development, 3.
78. Army Concept Team in Vietnam, Final Report: Fire Support Base Defense, I-1.
79. Ibid., II-56; Hay, Vietnam Studies: Tactical and Materiel Innovations, 19; III Marine Amphibious Force, Fire Support Base Development, 7.
80. Hay, Vietnam Studies: Tactical and Materiel Innovations, 103.
81. III Marine Amphibious Force, Fire Support Base Development, 2.

82. Cavazos, Analysis of Fire and Maneuver in Vietnam, June 1966 - June 1968, II-39.
83. Russell W. Glenn, "Urban Warfare Note," Unpublished Notes (94), 38.
84. Charles S. Kellar, The Roles and Functions of Fire Support in Peace Operations (Fort Leavenworth, KS: Command and General Staff College, 1994), 4.
85. Field Manual (FM) 7-98, Operations in Low-Intensity Conflict (Washington D.C.: US Government Printing Office, 1992).
86. TOE Handbook 06100L-CTH, Commanders' TOE Handbook: Division Artillery, Light Infantry Division (Washington, D.C.: Headquarters, Department of the Army, 1990), 290.
87. Neil C. Livingstone, "Fighting Terrorism and 'Dirty Little Wars'," Air University Review XXXV, no. 3 (March-April 1984): 9.
88. Center for Army Lessons Learned, US Army Operations in Support of UNOSOM II (Fort Leavenworth, KS: US Army Combined Arms Command, 1994), II-11-3.
89. Ibid., II-11-4.
90. Jenkins, International Terrorism and the Other World War, 27.
91. FM 6-50, The Field Artillery Cannon Battery, 3-15.
92. Center for Army Lessons Learned, Operation Restore Hope Lessons Learned Report, V-14.
93. Center for Army Lessons Learned, Operation Able Sentry (Fort Leavenworth, KS: US Army Training and Doctrine Command, 1995), 4.14.
94. TOE Handbook 06100L-CTH, Commanders' TOE Handbook: Division Artillery, Light Infantry Division, 290- 331.
95. Center for Army Lessons Learned, Operation Able Sentry, 4.14.
96. Ibid., 4.14.
97. For example the 10th MTN deployed from Hurricane Andrew to Somalia, the deployment to Rwanda, even Able Sentry occurred on a fairly tight time line.
98. Center for Army Lessons Learned, Operation Restore Hope Lessons Learned Report (Fort Leavenworth, KS: US Army Combined Arms Command, 1993), IV-22 to IV-23.
99. Center for Army Lessons Learned, US Army Operations in Support of UNOSOM II, II-2.
100. Center for Army Lessons Learned, Operation Able Sentry, 4.12.

101. Center for Army Lessons Learned, Bosnia Contingency Planning and Training (Fort Leavenworth, KS: US Army Combined Arms Center, 1994), II-12.
102. Joint Pub (JP) 3-10.1, Joint Tactics, Techniques, and Procedures (JTTP) for Base Defense (Baltimore, MD: US ARMY AG Publication Center, 1993), IV-14.
103. FM 6-50, The Field Artillery Cannon Battery, F-6.
104. Field Manual (FM) 7-10, The Infantry Rifle Company (Washington D.C.: US Government Printing Office, 1990), 5-5 to 5-7. The basic steps of planning a defensive position are;
1. Determine decisive points and times to focus combat power (when enemy attacks, where will combat power be massed, how will it mass, how must it be able to mass, etc).
  2. What results must be achieved at the decisive point (keep them out of wire, prevent vehicle entry, restore perimeter)
  3. Identify main and supporting efforts and their purpose (during attack, main effort is perimeter in contact, supporting effort is remainder of perimeter who must prevent envelopment of point in contact)
  4. Determine essential tasks; focus on terrain, enemy or friendly unit and insure intent is clearly transmitted
  5. Task organize to accomplish identified missions
  6. Assign command and control for all units
  7. Assign organic or attached units (not normally a problem in an FA unit)
  8. Establish control measures (fire control, sectors, signals, etc).
- The commander now weights the main effort (smaller sector, FPF, priority of fire etc). The plan is completed by; including the occupation plan for the defense, completing the fire planning (direct and indirect), positioning other assets and giving them missions (CPs, trains), developing CSS plan for resupply, casualty evacuation, and planning for contingencies.
105. FM 7-8, Infantry Rifle Platoon and Squad, 2-80.
106. Ibid., 2-81.
107. FM 6-50, The Field Artillery Cannon Battery, 2-8.
108. Hay, Vietnam Studies: Tactical and Material Innovations, 51. See in particular, Infantry Magazine (September-October 1969). Many Infantrymen I have spoken to are still against the DePuy foxhole for the same reasons listed. It is the doctrinal standard, however, and was successfully used by numerous units in Vietnam.
109. FM 7-8, Infantry Rifle Platoon and Squad, 2-9.
110. Arthur C. Lane, "Bunker Building - Advantages," Infantry 59, no. 5 (September-October 1969): 47-48.

111. James D. Stephens, "Bunker Building - Disadvantages," Infantry 59, no. 5 (September-October 1969): 49-50.
112. Americal Division Artillery, "Operational Report - Lessons Learned, Period Ending 31 January 1970" (15 February, 1970), 5-6.
113. FM 7-8, Infantry Rifle Platoon and Squad, 2-91.
114. Field Manual (FM) 6-50 Draft, The Field Artillery Cannon Battery (Unpublished), E-8.
115. Dennis D. McSweeney, Interviewed by Arturo Rodriguez (Carlisle Barracks, PA, 1985), 43-44. Officer was a battery commander in Vietnam.
116. FM 6-50, The Field Artillery Cannon Battery, F-7; 25th Infantry Division Artillery, "Operational Report - Lessons Learned, Period Ending 31 October 1968" (16 November, 1968), 9-10.
117. FM 7-8, Infantry Rifle Platoon and Squad, 2-9.
118. FM 6-50 Draft, The Field Artillery Cannon Battery, Figure E-1.
119. David H. Hackworth, "Dig Deep," Infantry 59, no. 1 (March-April 1969): 26.
120. Army Concept Team in Vietnam, Final Report: Fire Support Base Defense, II-17.
121. TOE Handbook 06100L-CTH, Commanders' TOE Handbook: Division Artillery, Light Infantry Division, 290-331.
122. Technical Manual (TM) 9-1015-203-12, Operators and Organizational Maintenance Manual for Howitzer, Light, Towed: 105-mm, M101A1 (Washington, D.C.: Headquarters, Department of the Army, 1987), 2-24; Technical Manual (TM) 9-1015-234-10, Operators Manual for Howitzer, Light, Towed: 105-mm, M102 (Washington, D.C.: Headquarters, Department of the Army, 1985), 1-27. Neither manual gives a specific lower limit to the number of soldiers required to operate the howitzer. Most units I observed at JRTC established the minimum in their Tactical SOP at five soldiers including the chief.
123. This was the role of the sapper in Vietnam. He did not seek to destroy all of a position, only a select few. Then he made his escape at minimum cost if possible. See also Ott, Field Artillery, 1954-1973, 14-17; Peterkin, "The Sapper," Infantry; US Military Assistance Command, Vietnam. "Special Survey on Red Sapper Groups South of the 17th Parallel." Lessons Learned 71 (13 March 1969).
124. William C. Schneek, After Action Report: Operation Restore Hope (Fort Belvoir, VA: Countermining Systems Directorate, US Army Belvoir Research, Development, and Engineering Center, 1994), 36. Multiple sources cite the uselessness of these so-called barriers. A single

strand does nothing to delay or channelize an attacker.

125. FM 7-10, The Infantry Rifle Company, 5-31 to 5-32.

126. Although chemicals were used around some of the positions occupied for extended periods, most used engineers and engineer equipment to do the clearing. See especially Fire Support Base Development, III Marine Amphibious Force for the sequence of fire base development and the role of the engineers.

127. Chemical defoliants, besides taking some time to work, will probably not be politically or environmentally correct. Similarly, the clearance of fields of fire using conventional means may also be restricted by political considerations and therefore must be factored into the analysis of the position. See FM 7-98, B-2 for a discussion of the use of herbicides in OOTW.

128. Army Concept Team in Vietnam, Final Report: Fire Support Base Defense, II-8.

129. Hay, Vietnam Studies: Tactical and Materiel Innovations, 98 (photo).

130. See the 23d Artillery Group, Artillery in Vietnam, 1969 which is an excellent pictorial anthology of artillery positions for all caliber weapons. Vehicles are located in the perimeter but they are conspicuously empty.

131. Most of the JRTC Take Home Packages surveyed made some mention of ammunition storage.

132. Phone conversation with several Army research agencies while assessing the impact of mortars on the firing battery at JRTC. The bottom line was that vehicles are more likely to burn and cause secondary explosions than a mortar round setting off an exposed artillery round.

133. Army Concept Team in Vietnam, Final Report: Fire Support Base Defense, II-5 to 6; Robert H. Stryjewski, Interviewed by Harold F. DeBolt (Carlisle Barracks, PA, 1983). Officer was a battery commander in Vietnam; Ronald, D. Turner, "Home in the Wilderness," Infantry 60, no. 2 (March-April 1970): 24.

134. Center for Army Lessons Learned, Operation Able Sentry, 4.14; Turner, "Home in the Wilderness," 25.

135. JP 3-10.1, Joint Tactics, Techniques, and Procedures (JTTP) for Base Defense, IV-14.

136. Thomas E. Swain, "FA and LIC: An Overview," Field Artillery Journal (April 1991), 6.

137. Keith W. Dayton and Richard P. Formica, "Marne Thunder: FA in OOTW and the Div Arty METL," Field Artillery Journal (February 1995): 9-13.

138. Scales, Firepower in Limited War, 86; Ott, Field Artillery, 1954-1973, 130-145.

139. William C. Schneck, After Action Report: Operation Restore Hope (Fort Belvoir, VA: Countermine Systems Directorate, US Army Belvoir Research, Development, and Engineering Center, 1994), 38

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